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ABSTRACT

A theoretical analysis of embedded organizations (parts of a larger organization) is developed and eight propositions relative to the use of modifying responses by such organizational units are offered. Research was conducted on the responses of two colleges within a university to their respective growing/declining resource environments over an 8-year period. Both had experienced substantial environmental shifts in enrollment and finances. Students who enrolled as majors were viewed as an element of the external environment (external to the parent organization), while financial resources for instruction came primarily from the internal environment (internal to the parent but external to the embedded unit). Adaptive responses used in the study included budgetary adjustments, programmatic adjustments, and technical (operational) adjustments. The finding that adaptive responses were used much more frequently than modifying ones led to the theoretical development of variables that might affect the ways in which embedded organizations react to environmental shifts. For embedded organizations, the internal environment, the constraints of the top administration of the parent organization, and the expectation that the parent organization would cope with the external environment outweighed modifying response to the external environment. (SW)

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ADAPTIVE RESPONSES AND THE TWO
ENVIRONMENTS OF ACADEMIC SUBUNITS

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ADAPTIVE RESPONSES AND THE TWO ENVIRONMENTS OF ACADEMIC SUBUNITS

Embedded organizations, those units that are parts of a larger, formal organization, have been studied and viewed as full-fledged organizations, *per se* (Khandwalla, 1977; Anderson & Paine, 1978). Yet, findings of a recent study (Babcock, 1981b) suggest modification of these earlier views. In that study of embedded organizations, adaptive responses to environmental change occurred more frequently than did modifying responses. (Adaptive responses are those that change the organization to fit the environment, while modifying responses attempt to change the environment to fit the organization.) The PIMS approach of studying relatively independent SBUs (strategic business units), particularly for research on strategy, has grown in prevalence. But, as Anderson and Paine (1978) point out, there is an inherent weakness in this approach. This weakness occurs because the "interactions among SBUs may create substantial benefits or negative contributions for the entire organization" (p. 604). It appears, then, that the time has come to evaluate the differences between the two levels of analysis (the embedded organization and the free-standing organization) and to determine what findings can be generalized to both levels, and what are unique to each level.

The purpose of this paper is to develop theoretical analysis of embedded organizations and to make propositions relative to the use of modifying responses by such organizational units. It will be based on research findings of the responses to a growing or declining resource environment by colleges within a university. The paper will begin with a discussion of the external and internal environments of embedded organizations. The methodology and findings of the specific research will be presented. Then, variables that influence responses of embedded organizations to the environment will be developed.

Environments of the Embedded Organization

While an embedded organization can be used as a unit of analysis in organizational behavior research with the expectation that the same behaviors are likely to occur in embedded as in parent¹ organizations (Khandwalla, 1977), one difference is noted. That difference is in the definition of the organization's environment. The embedded organization has two environments--one that is external to the parent organization and one that is internal to the parent but external to the embedded unit (Starbuck, 1976; Khandwalla, 1977; Van de Ven and Ferry, 1980). In fact, the parent organization may be a large, and powerful, part of the embedded organization's environment (Khandwalla, 1977). Thus, the embedded organization must be concerned about two environments--the internal and external. (See Figure 1.) These are likely to be different from each other, to differ in the ways in which each affects and constrains the unit, and to differ for each unit within the parent organization (Van de Ven & Ferry, 1980). For example, both Chevrolet and General Motors have been affected by lagging automobile sales in the last few years. Yet, Chevrolet is constrained in the actions it can take to cope with the situation, e.g., the use of rebates must be approved by GM. In addition, GM may be putting other pressures on Chevrolet, perhaps for internal efficiencies, e.g., similar styling for all GM brands. At the same time, Chevrolet is protected by GM from other environmental pressures.

Methodology

Responses of two colleges within a university to their respective environments over an eight-year time period were analyzed. Both had experienced substantial environmental shifts in enrollment and finances. Financial resource shifts were partly due to enrollment shifts and partly to decreases (in constant dollars) in state funding for the university. One college had growing enrollment and income

¹The term, "parent," is used to refer to the larger organization encompassing the embedded organization.

trends; the other was declining in terms of enrollment and financial resources. Students (who enrolled as majors) were viewed as an element of the external environment. Financial resources for instruction came primarily from the internal environment, although the external environment was a factor in the total amount available to the university.

Adaptive responses used in the study included (1) budgetary adjustments, (2) programmatic adjustments, and (3) technical (operational) adjustments. Two modifying responses² were examined. One was that of altering the rules of input/output exchange (Pfeffer & Salancik, 1978). Examples include changing admission and graduation requirements, and a change in mean grades. A second modifying response was that of altering financial resource dependency by developing multiple resource exchanges (Pfeffer & Salancik, 1978). These included emphases on organized research funding or continuing education programming and other public service activities.

Actual expenditures³ for instruction were used as indicators of each college's financial resources from the parent organization in tracking budgetary adjustments. Eight line items were used, including various salary categories and departmental allotments.

Findings

There were considerable changes in budgetary line items for both colleges. For the college in an increasingly scarce resource environment (S College), index numbers ranged from 21.6 to 138.2. Most of these items did not have a fairly straight trend line over the eight years of the study, but instead exhibited a see-saw appearance. For the college in an increasingly munificent resource

²For a discussion of the term, modifying responses, rather than manipulation or demand creation, see Babcock, 1981a.

³All raw data were converted to index numbers, with data for the first (base) year equivalent to 100. Financial data were first deflated into base year constant dollars before conversion to index numbers.

environment (M College), index numbers ranged from 85.6 to 413.2. All items showed a gradually increasing trend line, except for three items with larger increases.

With respect to programmatic changes, S College reorganized, combining six of its nine programs into three programs. Expenditures for programs ranged from an index of 83.5 to an index of 182.3. In the first few years of the study, program funding followed fairly straight trend lines upward, but after reorganization, selective funding occurred. In contrast, M College funded selectively in the early years, with increases for all programs in the later years. Index numbers ranged from 91.0 to 127.4. During this period of growth, M College increased its funding for administrative programs in support of resident instruction by taking over peripheral duties of the faculty.

Technical adjustments included such items as changing class size, number of courses and sections taught, student/faculty ratio, workload, teaching costs per student credit hour (SCH), and the percentage of SCH taught by permanent faculty. A number of changes were also evident here. For S College, index numbers ranged from 63.1 to 156.1, and for M College, from 64.5 to 172.6.

Thus, it is apparent that a number of adaptive responses were made, including changes in structure and resource allocations. Modifying responses, on the other hand, were much more difficult to detect and verify. Changes in admissions and graduation requirements could neither be confirmed nor disproved. Mean grades changed in the hypothesized directions, but the changes were too small to be significant.

There was evidence that the colleges attempted to alter their financial resource dependence upon the university, but S College was not as effective in this attempt as M College. External income for budget categories other than instruction ranged from 58.8 to 104.3 in index numbers for S College. However, in only one year was the index number over 100. The index numbers for M College ranged from

100 to 356.9. Net expenditures (total expenditures less income) for these budget categories indicate the effectiveness (or lack thereof) of this strategy. Net expenditures below 100 indicate less reliance on the university, while those over 100 indicate the opposite. The index of net expenditures for S College ranged from 92.8 to 183.0, with only the last two years below 100. In contrast, the index numbers for M College ranged from 64.8 to 104.1, with only one year above 100.

One aspect of external funding strategy should be noted. As external funds for research decreased in S College, the amounts for public service increased, so that in the later years of the study the percentage of external income for research was only slightly more than that for public service. In contrast, M College focused almost entirely on increasing research funds, partly because of declining overall resources for the university, and pressure from the university to increase external research funding.

The amounts of external income varied considerably from year to year. The average percentage of change for M College was 21.0. For S College, the increases and decreases from year to year nearly cancelled each other out, so that the average change was -0.5 per cent. The effectiveness of this strategy can be questioned because of the uncertainties and variation of returns involved over which the unit has little control.

Variables that Influence

Responses to the Environment

While successful organizations generally use both adaptive and modifying responses to a changing environment, these embedded organizations relied mainly on adaptive responses. There are a number of variables that may explain the difference between the responses of embedded organizations and free-standing organizations, variables that are affected by the relationship of the embedded organization and its parent. These include the degree of dependency upon the

parent organization, the availability of discretionary resources, the perception of external constraints, internal environmental constraints, the degree of control over responses, the organizational level of the embedded organization, the reward system, and the importance of the internal environment.

Dependency

The embedded organizations in this case, colleges within a university, are heavily dependent upon the parent organization for operational funds. This is more likely to be so in situations where income is not, or cannot, be attributable to the particular embedded organization (e.g., units that are not profit centers). Tuition from majors is not directed to the colleges of majors nor is tuition divided and distributed to the colleges offering courses that a student is enrolled in. By contrast, Chevrolet receives income from the cars its dealers sell, rather than as a resource allocation from General Motors.

Changes derived from the external environment are likely to be noted in the data collection system of the parent organization. The number of majors and of student credit hours generated by a college are data items that are reflected in the internal documents of the university, and comparisons are made with previous time periods. In the same way, Chevrolet and GM keep data on the numbers and types of Chevrolet cars that are sold and compare those data with that from other time periods. Since such data are collected and used by the parent organization, managers of embedded organizations focus their attention on such data and attempt to improve their standings (Hedberg et al., 1976; Pfeffer & Salancik, 1978). In the case of the colleges, such attempts tended to be adaptive in nature.

Proposition 1. The more dependent the embedded organization is on the parent organization for financial resources, the less likely it is that the embedded organization will attempt to modify the external environment and the more likely it is that it will take adaptive actions.

Resource Availability

One factor in implementing modifying responses is that of the availability of discretionary resources in the embedded organization. For example, in the case of the procurement of research grants, a college needs to be able to provide encouragement for faculty members to develop proposals. This includes released time from teaching or a lower workload in general, clerical help, and staff assistance. If a dean does not have the discretionary resources to provide this help for grant proposals, fewer grants are likely to be awarded. M College, for example, instituted an office to deal with the external environment in the hopes that it would assist in the generation of funds for the college. An embedded organization that does not have the funds available to develop modifying strategies is unlikely to undertake such actions.

Proposition 2. The fewer the discretionary resources available to the embedded organization, the less likely it is that it will attempt to modify the external environment.

External Environmental Constraints

The embedded organization may hold a perception that it cannot affect critical elements in the external environment. For example, a college may perceive that it cannot change the demographics relevant to its situation, change the job market, nor prevent the decline of federal funds for research. Public college administrators may perceive that they would be unable to influence legislators to increase funding to the university, particularly when states are having budgetary problems.

Proposition 3. The greater the embedded organization's perception that external environmental constraints are fixed, the less likely it is that it will attempt to modify those constraints.

Internal Environmental Constraints

In addition to perceived constraints in the external environment, there may be internal environmental constraints that prevent administrators of embedded

organizations from taking actions they consider necessary. Examples of such constraints include hiring freezes and a policy of normal attrition to reduce staff. Other actions may require the approval of higher level administrators or university-wide committees, such as requirements for admission to the major, graduation requirements, salary levels beyond the normal range, new courses, and new majors. In the same way, it is unlikely that Chevrolet would build a new model automobile without the approval of GM. These approval constraints might not prevent the embedded organization from making proposals for approval, but they are likely to prevent time spent on proposals the embedded organization perceives are unlikely to be approved. Actions are prevented, also, when proposals are not approved. For example, M College proposed several new programs that were never approved for funding. Norms that are held by many organizational members across subunits may also have a prohibitive effect. For example, a norm is likely to exist with respect to the number of courses required for a major within a minimum and maximum range.

Proposition 4. Constraints in the internal environment of the embedded organization are likely to limit its attempts to modify the external environment.

Control

Some actions that can be viewed as modifying responses may not even be considered by top-level administrators of an embedded organization. For one thing, such actions may not be easy to implement. Actions that require faculty input before implementation may take considerable periods of time. The management of embedded organizations whose members are professionals involves constraints imposed by the norms of professionalism. The finding regarding mean grades is an example of this. While more lenient or stricter grading practices might affect the number of majors in a college, persuading all the faculty to change their grading practices is an impossible task. While some faculty members might grade more leniently

to attract more students or more strictly to decrease student demand, others would insist that their practices should not be changed. Pressure on faculty members by the administrators might have some effect on those who are not yet tenured, but would have little effect on tenured faculty.

External funding efforts can also be affected by the lack of control on the part of administrators of an embedded organization. Research grants, for example, are usually obtained by individual faculty members. Even among those faculty members who obtain grants, there are likely to be periods between the end of one grant and the granting of another during which no research funds are brought into the embedded organization by those faculty members.

It should be noted that in the case of the colleges in this study, the data items used to measure the adaptive responses were generally items that the deans had some control over, e.g., expenditure line items, technical indicators, and organizational structure. The modifying responses, on the other hand, depended upon making systemic changes that involved a number of organizational actors whose goals were likely to be different from those of the deans (Cohen & March, 1974).

Proposition 5. The less control the administrator of the organization has over actions by organizational members that would assist in modifying the environment, the less likely it is that the embedded organization will pursue such a strategy.

Organizational Level

Since the colleges in this study are involved in the transformation process of the parent organization, they are considered to be part of the technical core of the university. It has been postulated that the institutional or strategic level (highest level) in an organization deals with problems in the external environment, and buffers the technical core from such problems (Thompson, 1967). Thus, the embedded organization, particularly one that involves the production function, may rely on the parent organization to modify the external environment for it. It is up to the university, then, to obtain funds and students. In the

same way, Chevrolet relies on GM to handle aspects of the external environment, such as lobbying.

Proposition 6. The greater the involvement of the embedded organization in the production function, the less likely it is that it will attempt to modify the external environment, and the more likely it is that it will rely on the parent organization to cope with the demands and constraints of that external environment.

Reward System

As mentioned previously, the data collection system of the parent organization plays a large role in the actions taken by organizational members. What gets measured, acknowledged, and rewarded is likely to have a large impact on administrators of embedded organizations. In the case of the colleges, the data collected were more amenable to adaptive responses. It was also easier to try to manipulate those data.

The importance of rewards can be seen in another finding in the Babcock study that funding for S College did not decline as rapidly as enrollment. Despite policies to the contrary, this may have appeared as "reward" enough to S College so that further actions, that could have been taken, were not.

Proposition 7. The less that modifying responses of an embedded organization are acknowledged, measured, and rewarded by the parent organization, the less likely it is that such actions will be undertaken.

Impact of the Internal Environment

Not only does the internal environment make up a "substantial chunk" of the embedded organization's environment (Khandwalla, 1977), but it also appears to be a very powerful factor in the responses of those organizations. It is probable that in this study not all modifying responses were tapped (it was not intended to be all-inclusive). The modifying responses that may be most effective for an embedded organization are likely to be those that are aimed at the parent organization and intended to change the internal environment. In fact, S College developed

many materials to present their case to the budgeting committee and provost during the resource allocation process. These included manipulations of university data that presented S College in a much more favorable light. The political process might have also been a factor (Pfeffer & Salancik, 1974). Such responses could be considered effective since S College's funds did not decline as rapidly as enrollment, and in fact, the gap between the two widened in the last few years of the study. By 1978-79, the index numbers were 76.6 for total expenditures (a measure of funds received) and 60.3 for enrollment of majors. In contrast, M College was not able to garner the funds needed for its growing enrollment. And, again, the gap widened over a number of years. In 1978-79, the index numbers were 123.0 for expenditures and 145.2 for enrollment.

Proposition 8. Embedded organizations are more likely to utilize modifying responses to attempt to change the internal environment in the parent organization than to attempt to change the external environment.

Conclusion

Based on a study of embedded organizations and their responses to a changing environment, this paper demonstrated some differences between embedded and parent organizations. The finding that adaptive responses were used much more frequently than modifying ones led to the theoretical development of variables that might affect the ways in which embedded organizations react to environmental shifts. For embedded organizations, the internal environment, the constraints of the top administration of the parent organization, and the expectation that the parent organization would cope with the external environment outweighed modifying responses to the external environment.

While embedded organizations may be studied by organizational theorists as separate entities, generalizations from such research need to be utilized with care with respect to parent, or free-standing, organizations. Conversely, generalizations from research on parent organizations should be applied to embedded organizations carefully. Research needs to be conducted on the proposed variables, with

development of operational measures, in a wide variety of organizations. Further research into the differences between embedded and parent organizations needs to be completed, including differences among organizations, such as holding companies and conglomerates versus single-purpose organizations, to determine how much effect an embedded organization's degree of autonomy has on its environmental responses. Clearly, such research will have benefits in understanding the behavior of organizations.

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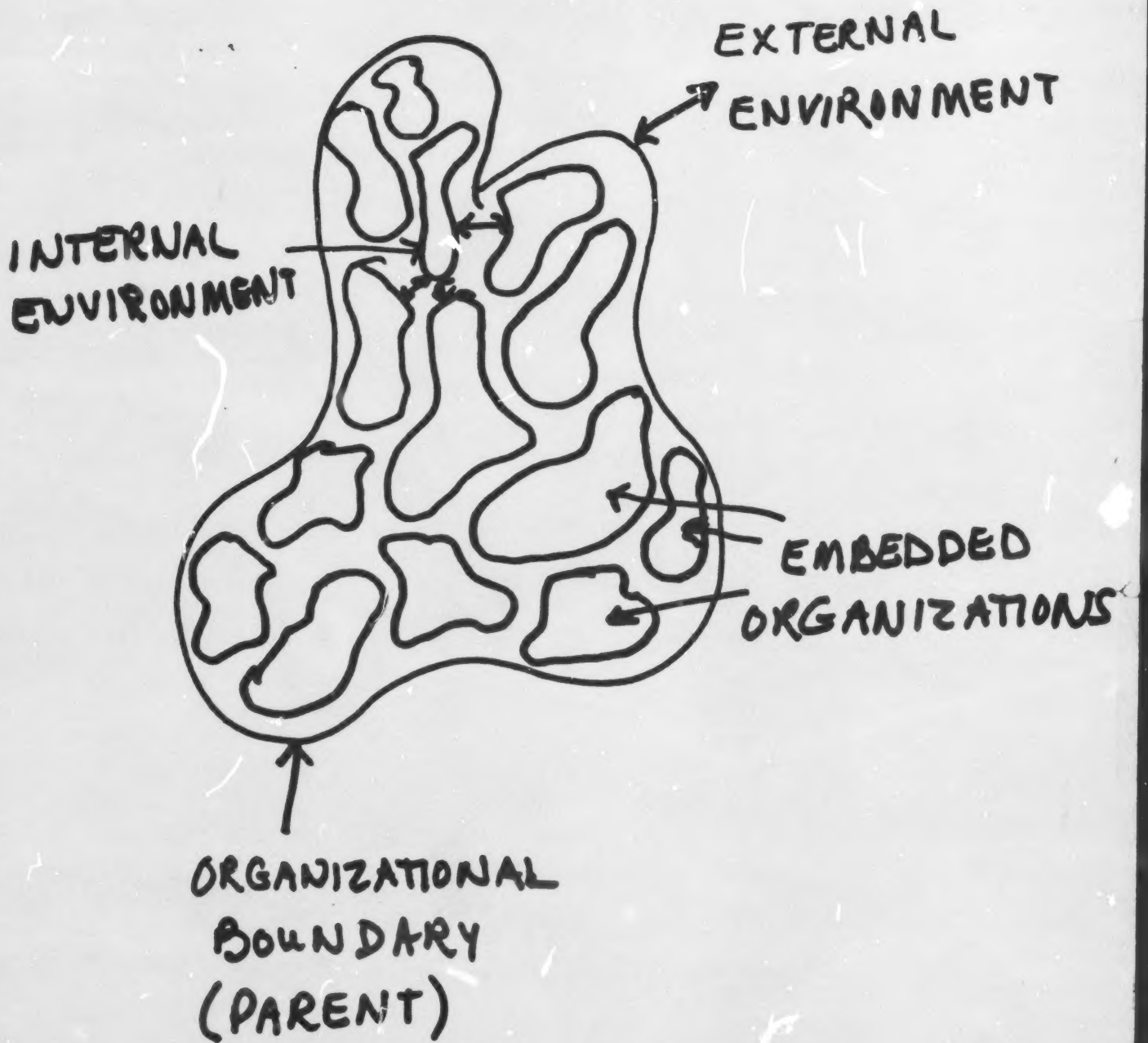


Figure 1.